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SOLAR OBSERVATIONS.

SOLAR AND SKY RADIATION MEASUREMENTS DURING APRIL, 1923.

By HERBERT H. KIMBALL, In Charge, Solar Radiation Investigations.

For a description of instruments and exposures, and an account of the method of obtaining and reducing the measurements, the reader is referred to this REVIEW for April, 1920, 48:225, and a note in the REVIEW for November, 1922, 50:595.

From Table 1 it is seen that direct solar-radiation intensities averaged slightly below the normal values for April at Lincoln, Nebr., and close to normal at Washington, D. C., and Madison, Wis.

Table 2 shows for all three stations only unimportant departures from the average total amount of solar and sky radiation received on a horizontal surface during April.

Skylight-polarization measurements obtained at Washington on 12 days, give a mean of 52 per cent, with a maximum of 64 per cent on the 24th. At Madison, measurements obtained on four days during the last half of the month give a mean of 58 per cent, with a maximum of 65 per cent on the 18th. These are slightly below average values for April at the respective stations.

TABLE 1.—Solar radiation intensities during April, 1923.

[Gram-calories per minute per square centimeter of normal surface.]
Washington, D. C.

Date.	Sun's zenith distance.										Local mean solar time.	
	8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°		Noon.
	75th mer. time.	Air mass.										
		A. M.					P. M.					
e.	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0	5.0	e.		
Apr. 2.....	mm. 2.62	cal. 0.71	cal. 0.83	cal. 1.05	cal. 1.38	cal. 1.11	cal. 0.79	cal. 0.64	cal. 0.59	mm. 2.36		
6.....	4.17	0.65	0.83	1.03	1.41	1.03	0.79	0.64	0.59	3.99		
7.....	5.56	0.66	0.91	1.03	1.34	0.84				4.37		
9.....	2.49	0.73	0.85	1.00	1.22					2.74		
11.....	5.79	0.57	0.75	0.96	1.09					4.57		
12.....	5.56			0.89	1.09					5.79		
18.....	3.00	0.87	1.10	1.30						2.87		
19.....	3.30	0.71	0.82	0.94	1.08	1.41	1.02	0.84	0.70	3.63		
20.....	7.57			1.35	0.98	0.81	0.72	0.60		4.37		
21.....	7.04			0.86						7.57		
23.....	6.50		0.80							7.57		
24.....	3.45	0.85	0.94	1.06	1.25	1.39	1.07	0.89	0.74	3.15		
25.....	4.57		0.98	1.18	1.41	1.05	0.83	0.71	0.59	4.17		
26.....	3.81			1.12						3.30		
Means.....		0.76	0.76	0.92	1.09	1.35	1.01	0.83	0.70	0.59		
Departures.....		+0.07	+0.01	+0.04	+0.02	-0.02	-0.06	-0.06	-0.03	+0.01		

Lincoln, Nebr.

Date.	Sun's zenith distance.										Local mean solar time.	
	8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°		Noon.
	75th mer. time.	Air mass.										
		A. M.					P. M.					
e.	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0	5.0	e.		
Apr. 5.....	mm. 4.17	cal. 0.67	cal. 1.04	cal. 1.31	cal. 1.19					mm. 2.36		
9.....	3.81									2.62		
10.....	3.00	0.80	0.93							3.30		
11.....	5.36							0.82		6.76		
14.....	4.17	0.96	1.02	1.11	1.35					3.45		
17.....	3.63			1.15	1.41					3.81		
18.....	4.17	0.56	0.73	0.94	1.09	1.26	0.99	0.69		5.36		
24.....	4.75	0.89	0.97	1.15	1.35	1.50	1.20			6.50		
30.....	7.29			1.15						7.57		
Means.....		0.80	0.88	0.96	1.20	1.39	(1.10)	(0.76)				
Departures.....		+0.04	+0.03	-0.04	-0.02	-0.06	-0.07	-0.20				

TABLE 2.—Solar and sky radiation received on a horizontal surface.

Date.	Madison, Wis.									
	3.00				1.44	1.25	1.09			3.30
Apr. 5.....	3.00				1.44	1.25	1.09			3.30
12.....	3.30			1.33	1.52	1.10				4.37
14.....	4.37			1.24						3.81
17.....	3.99			1.29	1.50					3.30
18.....	4.57		1.04	1.23	1.47	1.07				5.36
19.....	5.36			1.36						8.18
20.....	7.29			0.97						8.81
25.....	4.17			1.16						5.16
28.....	4.95			1.20	1.41					5.36
30.....	5.79			1.00						5.79
Means.....			(1.04)	1.18	1.45	1.14	(1.09)			
Departures.....			-0.05	-0.05	+0.03	-0.09	+0.01			

Week beginning.	Average daily radiation.			Average daily departure for the week.			Excess or deficiency since first of year.		
	Washington.	Madison.	Lincoln.	Washington.	Madison.	Lincoln.	Washington.	Madison.	Lincoln.
Apr. 2.....	cal. 362	cal. 324	cal. 435	cal. -28	cal. -57	cal. +5	cal. -2,836	cal. -789	cal. +479
9.....	306	445	497	-100	+49	+74	-3,534	-445	+1,000
16.....	508	442	429	+84	+28	+1	-2,948	-248	+1,007
23.....	430	457	425	-16	+19	-23	-3,058	-117	+845

*Extrapolated.

WEATHER OF NORTH AMERICA AND ADJACENT OCEANS.

NORTH ATLANTIC OCEAN.

By F. A. YOUNG.

The average pressure for the month was not far from the normal at land stations in Newfoundland and on the Atlantic coasts of Canada and the United States, as well as in the West Indies. It was somewhat above normal in the Azores and Bermudas, and also at Lerwick, Shetland Islands, while considerably below in England and Ireland, due to the period of low pressure in that locality that extended from the 6th to the 15th.

Fog was unusually prevalent over the Grand Banks, as it was reported on 17 days in the region between the 40th and 45th parallels and 45th and 55th meridians. The number of days in which it was observed was also considerably above the normal along the coast of the United States, north of Hatteras, and slightly above over the middle section of the steamer lanes, while fog was apparently rare in the vicinity of the European coast.

Considering the ocean as a whole, the stormy weather that had prevailed since August still continued, as the number of days on which winds of gale force were reported was considerably greater than usual, although unevenly distributed as to location. Gales were unusually numerous in the region between the 30th and 40th parallels and the 65th and 80th meridians, and also over the eastern section of the steamer lanes, while in mid-ocean the number of days on which they occurred did not differ materially from the normal as shown on the Pilot Chart.

On the 1st and 2d there was an area of unusually high pressure over the middle Atlantic States, while the atmospheric conditions in the West Indies were about normal. The steep gradient was responsible for stormy weather between the 70th meridian and the Georgia and Florida coasts, accompanied by comparatively high barometric readings. Storm log:

American S. S. *El Alba*:

April 1, 7 a. m. in latitude 31° 12' N., longitude 79° 30' W., barometer 30.39 inches, wind NE., 8, weather cloudy. 4 p. m. fresh NE. gale, high sea, overcast. 7 p. m. in latitude 33° N., longitude 77° 30' W., barometer 30.62 inches, wind NE., 7, weather cloudy. Midnight, wind and seas moderating, overcast and squally.

American S. S. *Imlay*:

Gale began on the 1st, wind NE. Lowest barometer 30.07 inches at 7 p. m. on the 1st, wind NE., 8, in latitude 25° 30' N., longitude 74° 15' W. End on the 2d. Highest force of wind 9; shifts SE.-NE.-ENE.-SE.

On the 1st, St. Johns, Newfoundland, was near the center of an area of low pressure, and southwesterly gales prevailed in the southeasterly quadrants, as shown by following storm log:

U. S. Coast Guard cutter *Tampa*:

Gale began on the 1st, wind WSW. Lowest barometer 29.83 inches at 6 a. m. on the 1st, wind SW., in latitude 44° 05' N., longitude 47° 07' W. End at 3 p. m. on the 1st, wind NW. Highest force of wind 9; shifts WSW.-SW.-W.-NW.

From the 3d until the 5th there was no unusual weather, taking the ocean as a whole, although a few reports of moderate gales were received from vessels in the middle and eastern sections of the steamer lanes.